S P E C I F I C A T I O N

High Speed Safety Block Assembly

BACKGROUND OF THE INVENTION

The field of the invention is block assemblies for suspending equipment and things with cables and the like.

Block assemblies have long been used to provide a mechanical advantage to reduce the pulling force required to support the load being suspended. For example, when a pair of block assemblies are used together, a 2:1 mechanical advantage is gained. When two pairs of block assemblies are used together, a 4:1 mechanical advantage is provided. Additional mechanical advantage is achieved by increasing the number of block assemblies used. Alternatively, a single block assembly can be used as a pulley to support a load without any mechanical advantage.

In the motion picture industry, especially in the stunt business, equipment and other items are frequently suspended from above with cables or ropes over block assemblies. Typically, the block assembly is high overhead and is not easily seen or inspected. Stunt persons and other actors are also frequently supported by cables using block assemblies. Thus, safety is a great concern, particularly with the reliability of the block assemblies.

When block assemblies are used in the stunt business, there are frequently high performance, reliability and safety demands placed on the equipment used. Thus, there is a need for a block assembly that is capable of supporting very high loads at high rates of

speed, while maximizing the safety and reliability of the device.

SUMMARY OF THE INVENTION

To these ends, there is provided a high speed safety block assembly having first and second cheek plates with a sheave and axle located therebetween. The cheek plates each have a recessed area on their inner surfaces and have interlocking ears that increase the safety of the block assembly. The sheave of the high speed safety block assembly includes a needle bearing that rolls on the bearing surface of the axle. Other and further objects and advantages will appear hereinafter

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, wherein similar reference characters denote similar elements throughout the several views:

FIG. 1 is an exploded perspective view of a high speed safety block assembly.

FIG. 2 is a perspective view of a high speed safety block assembly in a closed position.

FIG. 3 is a perspective view of a high speed safety block assembly in an open position.

FIG. 4 depicts the combination of block assemblies to gain a mechanical advantage.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning in detail to the drawings, Figure 1 depicts a preferred embodiment of high speed safety block assembly 10. Block assembly 10 is comprised of a first cheek plate 12 and a second cheek plate 14. Held between cheek plates 12 and 14 is sheave 16 which is supported between cheek plates 12 and 14 by an axle 18. Block assembly 10 is held together with screw 20 and nylon washer 24 and steel washer 22.

In a preferred embodiment, first cheek plate 12 and second cheek plate 14 are machined from aluminum and each have a top end 58 and a bottom end 60 and an inner surface 56 and an outer surface 57. Machined into inner surface 56 of cheek plates 12 and 14 is a recessed area 28. Recessed area 28 is slightly larger in diameter than sheave 16 and also has a through hole 36 centrally located. Recessed area 28 preferably also includes a raised shoulder 30 surrounding hole 36. Recessed area 28, into which sheave 16 fits, provides an additional measure of safety when block assembly 10 is in use as shown in Figure 4. Recessed area 28 prevents cable 62 from slipping down onto axle 18 in the event cable 62 comes off of sheave 16.

Also machined into first cheek plate 12 and second cheek plate 14 are raised ear sections 46. Ear sections 46 are located at top end 58 and bottom end 60 of cheek plates 12 and 14. Ear sections 46 extend from inner surface 56 and define slots 44 between inner surface 56 and ear sections 46. Slot 44 is open at end 45 of each ear section 46. As shown in Figure 1, ear sections 46 are arranged in opposite directions such that slot 44 and end 45 of ear section 46 at top end 58 of cheek plates 12 and 14 face the opposite direction of slot 44 and end 45 of ear section 46 at bottom end 60 of cheek plates 12 and 14. When block assembly 10 is assembled, as shown in Figure 2, ear sections 46 on first

cheek plate 12 fit into slots 44 on second cheek plate 14, and vice versa. The interlocking of ear sections 46 on cheek plates 12 and 14 provides and extra measure of safety by holding block assembly 10 together should screw 20 fail.

Cheek plates 12 and 14 also include a through hole 32 at top end 58 at ear section 46. Hole 32 serves as a point of attachment for block assembly 10, as shown in Figure 4.

In a preferred embodiment of block assembly 10, cheek plates 12 and 14 are also provided with a slotted hole 34 through the plates at bottom end 60. Slotted hole 34 serves as a point of attachment when block assemblies 10 are combined to provide a mechanical advantage, as shown in Figure 4. Slotted hole 34 advantageously allows for some tolerance when block assembly 10 is being rigged for use. Typically, a caribeener or shackle 64 is placed through slotted hole 34 which also provides an extra measure of safety in keeping block assembly 10 closed.

In a preferred embodiment of block assembly 10, sheave 16 is a single circular piece of machined aluminum. Sheave 16 includes a groove 42 around the periphery of its rim 43. Groove 42 supports cable 62 when block assembly 10 is in use, as shown in Figure 4. Sheave 16 has a through hole 38 located through the center of sheave 16. Sheave 16 also includes a needle bearing 26 installed into hole 38. In a preferred embodiment, needle bearing 26 is press fit into hole 38.

Axle 18 is preferably machined from hardened steel and includes a bearing surface 51, a first end 50, and a second end 52. Axle 18 preferably has a threaded hole 54 through the longitudinal axis of axle 18. The outside diameter of bearing surface 51 of axle 18 is matched to the inside diameter of needle bearing 26 such that when block assembly 10 is in use, needle bearing 26 of sheave 16 rolls on bearing surface 51 of axle

18. Axle 18 also advantageously includes a small transverse lubrication hole 48 through one side of bearing surface 51 to the center space defined by threaded hole 54. When block assembly 10 is in use, a lubricant is preferably put into threaded hole 54 whereby the lubricant will self lubricate roller bearing 26 through lubrication hole 48.

In a preferred embodiment, first end 50 of axle 18 has a larger outside diameter than second end 52. In this configuration, first end 50 of axle 18 is press fit into hole 36 on first cheek plate 12. With axle 18 press fit into hole 36 on first cheek plate 12, sheave 16, with needle bearing 26 already installed, can then be fitted onto axle 18 such that needle bearing 26 rolls on bearing surface 51 of axle 18. Second cheek plate 14 is then placed onto axle 18 with second end 52 of axle 18 fitting within hole 36 on second cheek plate 14. When block assembly 10 is in a closed position, such as shown in Figure 2, block assembly 10 will hold together despite the absence of screw 20. To securely hold together block assembly 10, screw 20 is installed through hole 36 on second cheek plate 14 and into threaded hole 54 on second end 52 of axle 18. Preferably, nylon washer 24 and steel washer 22 are also used. Additionally, a second screw 20 (not shown) can be installed into threaded hole 54 at first end 50 of axle 18. This screw is not essential to hold block assembly 10 together, however, because first end 50 of axle 18 is press fit into hole 36 on first cheek plate 12.

Figure 4 depicts the use of a combination of two pairs of block assemblies 10 to gain a 4:1 mechanical advantage. When block assemblies 10 are used side by side, as shown in Figure 4, it is advantageous to arrange the block assemblies 10 such that first plate 12 of one block assembly 10 is set face to face with first cheek plate 12 of another block assembly 10. In this configuration, screw 20 is not installed into threaded hole 54

at first end 50 of axle 18 of either block assembly 10 so that the two block assemblies 10 may flush against each other, as shown in Figure 4. Thus, when block assemblies 10 are combined or "ganged" together, no separate spacer (not shown) is required between the block assemblies 10.

Once assembled, block assembly 10 can be opened as shown in Figure 3. When cheek plates 12 and 14 are counter rotated, as shown in Figure 3, access to sheave 16 is gained. In this fashion, a cable 62 or rope can be placed onto groove 42 of sheave 16 without having to disassemble block assembly 10. When rotated back to the closed position shown in Figures 2 and 4, block assembly 10 is ready for use.

When in use, block assembly 10 is capable of supporting greater loads and much higher rates of speed than prior devices. Prototypes of block assembly 10 have safely supported 5000 pound loads up to 2000 RPM (revolutions per minute) as well as 3000 pound loads up to 5000 RPM.

Lastly, while the features shown and described above exemplify the present invention, various modifications may be made without departing from the spirit and scope of the invention.